UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

IN RE: METHYL TERTIARY BUTYL ETHER ("MTBE") PRODUCTS LIABILITY LITIGATION	:	**Master File No. 1:00–1898** **MDL 1358 (SAS)** **M21-88**
This document relates to: **Orange County Water District v. Unocal Corp., et al., No. 04 Civ. 4968**	:	

DECLARATION OF MICHAEL AXLINE IN SUPPORT OF PLAINTIFF ORANGE COUNTY WATER DISTRICT'S OPPOSITION TO DEFENDANTS' OBJECTION TO AND MOTION TO STRIKE THE DECLARATION OF STEPHEN WHEATCRAFT SUBMITTED IN OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

I, Michael Axline, declare:

1. I am one of the attorneys of record in this case for plaintiff Orange County Water District. I make this declaration from personal knowledge.

2. Attached as Exhibit 1 is a table entitled "Comparison of Wheatcraft Declaration with Report and Deposition." This table contains excerpted statements from Dr. Wheatcraft's declaration provided in opposition to defendants' motion for summary judgment with statements made by Dr. Wheatcraft in his expert report and deposition in this case. True and correct copies of the expert report and deposition from which these statements were excerpted are also attached as stated below.

3. Attached as Exhibit 2 is a true and correct copy of excerpts from the Expert Report of Stephen Wheatcraft, Ph.D., dated June 23, 2011.

4. Attached as Exhibit 3 is a true and correct copy of excerpts from the deposition of Dr. Wheatcraft, taken by defendants on January 16, 2012.

5. Attached as Exhibit 4 is a true and correct copy of excerpts of the deposition of Dr. Wheatcraft, taken by defendants on January 17, 2012.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed this 25th day of August, 2014, at Sacramento, California.

/s/
MICHAEL AXLINE

Exhibit 1

Orange County Water District v. Unocal Corp., et al.
Case No. 04 civ. 4968 (SAS)
Comparison of Wheatcraft Declaration With Report and Deposition
Submitted in Support of Plaintiff's Opposition to Defendants' Objection and Motion to Strike Wheatcraft Declaration

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
A separate MTBE source term for each of the focus plume stations was added to the model at the location of the station. The source term for each focus plume station was calculated using actual data from MTBE detections in monitoring wells located at or associated with each individual focus plume station. The monitoring well data for each focus plume station was collected from station consultant reports or quarterly monitoring reports associated with the focus plume stations. The MTBE source term thus represents the MTBE released to groundwater from each individual focus plume station. The model thus depicts the transport of MTBE released at each focus plume station through the aquifer to production wells within the District's service area, although the model does not isolate each station. (¶ 4)	The term "mass loading" refers to the process of providing the contaminant transport model . . . with information regarding MTBE sources . . . Mass loading of MTBE is based on observed concentrations at gas station monitoring sites . . . Thirty four gas stations are analyzed. . . ." (Expert Report at § 10.1, p. 22.)	Q. . . . do you know if all of the detectable MTBE, which was observed in monitoring wells and used to interpolate the mass to be introduced in the model, came from the 34 stations and only the 34 stations? A. The mass that was introduced in our model came from those 34 sites and the monitoring -- and the concentrations from the monitoring wells on and around those sites. And those were the only ones that we considered. (Jan. 16, 2012, at 120:12-22.) A: . . . We used the data from the RP sites, which is really defendants' data. We developed our source terms using your data . . .

August 25, 2014

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
		(Jan. 16, 2012, at 180:2-15.) A: [We] used . . . all the information we had for the site . . . -- particularly if it were monitoring well data, then it was directly used in terms of coming up with a mass -- mass loading calculations. We examined the data for each and every one of these sites. As I say, a million and a half . . . pages of data . . . that we went through. And there's 42,000 individual concentration data points in our database. (Jan. 16, 2012, at 127:4-22.)
The MTBE that originated from defendants' stations is migrating off site and mixing with other MTBE from nearby stations to form MTBE plumes. (¶ 5.)	Groundwater remediation at the focus plume stations . . . has not prevented offsite migration of MTBE." (Expert Report at 8, ¶ 4.) "MTBE is highly mobile and persistent in groundwater and groundwater is continuously in motion. As a	

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
	consequence, MTBE released at the focus plume stations would have begun migrating off site as soon as it entered groundwater." (Expert Report at 8, ¶ 7 [emphasis added].) "Because MTBE is highly mobile, it is highly likely that large amounts of the releases from these sites [the 34 gasoline stations at issue] have moved off-site." (Expert Report at 9 [emphasis added].) "If contamination plumes from two different sources are in close proximity to one another the plume may mix or comingle in the aquifer. . . . Due to the complex hydrogeological processes taking place in the aquifer beneath Orange County and the amount of time that lapsed between the known release and remediation action **many petroleum hydrocarbon releases that occurred at**	

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
	the 34 focus gas stations are comingling in the aquifer." (Expert Report at § 8.3, p. 19 [emphasis added].)	
MTBE contamination will naturally migrate down gradient or toward production wells because of the influence that pumping wells have on the movement of water in an aquifer. (¶ 5)	"MTBE leaks from USTs and other sources into the subsurface environment. The subsurface environment contains water, and the water is . . . in continual motion." (Expert Report at §6.2, p. 11.) "Once gasoline encounters the water table, MTBE dissolves in and is transported with groundwater." (Expert Report at § 6.4, p. 14.) "These chemical plumes will travel along in the groundwater, following the flow downgradient. When a contamination plume nears a pumping well the contamination will be caught by the wells capture zone and drawn up into the well." (Expert Report at 19.)	Q. Do you . . . have any evidence, of which you are aware, any MTBE has migrated off-site from the Unocal 5226 station? A: There's plenty of evidence for it. The fact that MTBE is -- is present on-site in those monitoring wells, groundwater is flowing, MTBE is highly mobile and dissolves readily in groundwater, it doesn't attenuate very well, it's not very biodegradable, it doesn't sorb very well . . . So once -- once MTBE is in groundwater, it's going to migrate off-site unless it's stopped. (Jan. 17, 2012, at 400:3-21.)

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
The model shows that MTBE from each of the focus plume stations has contributed to at least one focus plume. (¶ 5)	"A significant amount of MTBE has been released to groundwater within the Orange County Water District's service area." (Expert Report at 8, ¶ 1.) "At most stations, MTBE was in groundwater for more than a decade before groundwater remediation began." (Expert Report at 8, ¶ 5.)	Q. Do you have an opinion that MTBE from the collection -- taken all together, of all 34 stations, that some MTBE from those 34 stations has in the past reached one or more drinking water wells as opposed to that MTBE coming from stations or underground storage tanks that you did not include in your model? A: I believe collectively that some MTBE from one or more of these stations has reached one or more production wells in the past. (Jan. 17, 2012, at 373:6-18.) Q. . . . What is the basis for you to say that one or more of the 34 stations released MTBE that has gotten into one or more drinking water wells?

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
		A. The overall behavior of the model, it is showing MTBE mass moving from these stations towards -- towards the wells and, in some cases, having reached the wells. And there are wells that have had detections. Some of these detections are in the vicinity of these stations and so-called plumes. So it seems certainly more likely than not that some of these stations have, in fact, impacted production wells already. (Jan. 17, 2012, at 373:22-375:2.)
As the MTBE plumes migrate, they will intermix with each other in the subsurface of the aquifer. This migration may take years to tens of years. (¶ 6)	"If a gasoline release does occur through a UST source the release will migrate through soils beneath the site and into groundwater. Once the gasoline release reaches groundwater near the source it initially floats on top of the groundwater before the individual chemicals that make up the gasoline begin to separate and mix with the water. The separate chemicals	Q. And do you have opinions concerning the timing and concentration of future MTBE impacts in drinking water wells in Orange County? * * * A. . . . But the nature of the opinions is that there is a great deal of MTBE that has been released into the aquifers in Orange County, and that MTBE is not going

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
	react differently n groundwater and the result is the formation of complex contamination plumes." (Expert Report at § 8.1, pp. 18-19.) "Due to the complex hydrogeological processes taking place in the aquifer beneath Orange County and the amount of time that lapsed between the known release and remediation action many petroleum hydrocarbon releases that occurred at the 34 focus gas stations are comingling in the aquifer." (Expert Report at § 8.3, p. 19.)	away. It's being -- much of it is migrating towards production wells and will reach production wells sometime in the future and become a significant issue that will have to be dealt with unless something has been -- is done ahead of time to remediate the problem. (Jan. 17, 2012, at 360:24-361:15.)
When the model is run with the MTBE source terms from each individual focus plume station, the model predicts that MTBE will reach [certain wells] associated with Focus Plume numbers 1, 2, 3, 8 and 9 . . . Graphs showing the date and concentration of MTBE predicted in each of these wells are attached to my		Q. . . . in your analysis, [do] you have objective results that show that MTBE coming from this collection of stations, in fact, has reached the drinking water well . . . ? A: The plumes that -- and the -- and the RP sites or stations that looking at

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
expert report as Appendix B and C. (¶ 8 [emphasis added].)		here were selected by both plaintiffs' and defendants' . . . as the most likely sources for MTBE releases in close proximity to District production wells. So my model shows that these sources impact these wells. (Jan. 17, 2012 at 376:9-377:3.) Q. Did you do anything to independently verify their representation to you that these 34 stations were the most likely sources of MTBE that has impacted or will impact drinking water wells in Orange County? A: Yes, we reviewed a million and a half pages of information on these various sites from RP reports and data, and assimilated and analyzed and studied and collected this information into a database,

Wheatcraft Declaration	Wheatcraft Expert Report & Rebuttal	Wheatcraft Deposition
		and then put that information into a model which certainly is consistent with that opinion. (Jan. 17, 2012, at 378:23-379:11.)

Sources:

1. July 21, 2014, Declaration of Stephen W. Wheatcraft, Ph.D. in Support of Plaintiff's Opposition to Motion for Summary Judgment.

2. June 22, 2011, Expert Report of Stephen W. Wheatcraft, Ph.D ("Expert Report").

3. Deposition of Stephen W. Wheatcraft, taken in this matter on January 16, 17, 2012.

Exhibit 2

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

In re: Methyl Tertiary Butyl Ether ("MTBE") Products Liability Litigation

Master File No. 1:00-1898
MDL 1358 (SAS)
M21-88

This Document Relates To:

Orange County Water District v. Unocal Corp., et al., No. 04 Civ. 4968

EXPERT REPORT OF STEPHEN W. WHEATCRAFT, Ph.D.

Wheatcraft & Associates
Reno, Nevada

Stephen W. Wheatcraft

June 23, 2011

Signature

Date

The purpose of this expert report is to explain the methodology employed in constructing and running groundwater flow and MTBE transport models, and to provide an opinion regarding the results of these models. I was asked to determine whether any releases of MTBE gasoline from 34 pre-selected stations had or would reach drinking water wells within Orange County Water District's service area. I was also asked to provide an opinion as to the mobility, fate and transport and persistence of any MTBE that was released within the Orange County Water District service area. My opinions are as follows:

1. A significant amount of MTBE has been released to groundwater within the Orange County Water District's service area.

2. MTBE was likely in groundwater for years before any sampling for MTBE occurred.

3. This MTBE, if not remediated, will impact water production wells in OCWD's service area. MTBE has already been detected in a number of wells.

4. Groundwater remediation at the focus plume stations I reviewed has not prevented off-site migration of MTBE.

5. At the stations I reviewed, MTBE was in groundwater for years before groundwater remediation was initiated. At most stations, MTBE was in groundwater for more than a decade before groundwater remediation began.

6. The average time from known release to the start of remediation is 11 years, and the longest time between known release and start of remediation is 22.5 years.

7. MTBE is highly mobile and persistent in groundwater and groundwater is continuously in motion. As a consequence, MTBE released at the focus plume stations would have begun migrating off site as soon as it entered groundwater.

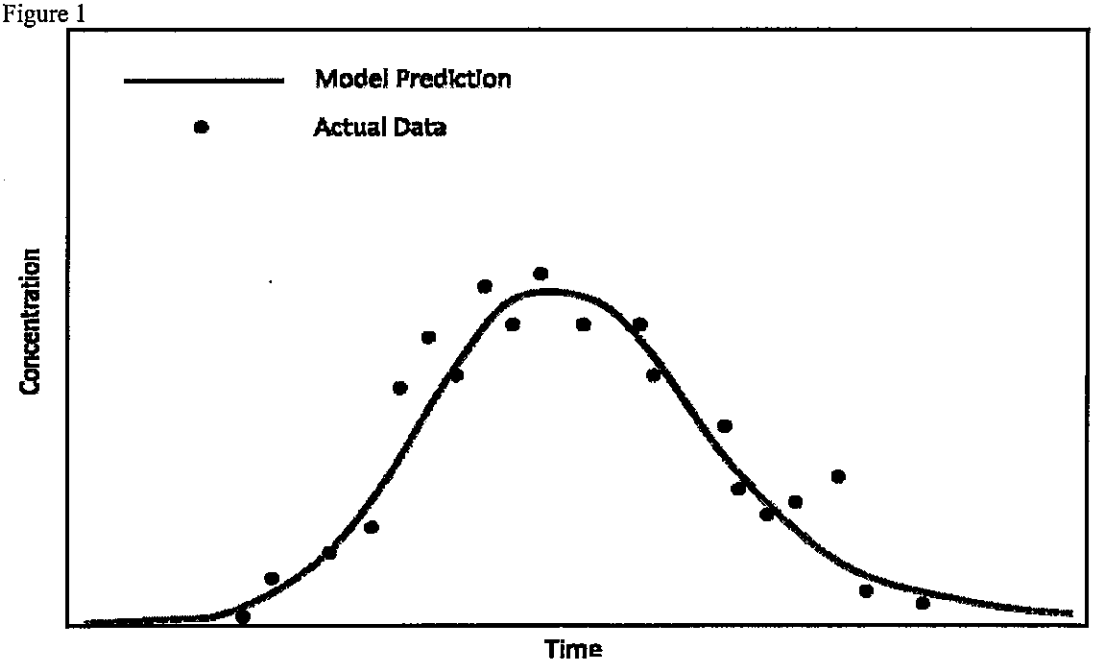
8. The MTBE transport model predicts (details are in Appendices B and D):
    a. 190 district production wells exceed 0.2 ug/l MTBE after 10 years
    b. 19 additional district production wells exceed 0.2 ug/l MTBE after 20 years
    c. 28 additional district production wells exceed 0.2 ug/l MTBE after 30 years
    d. 19 additional district production wells exceed 0.2 ug/l MTBE after 40 years
    e. 108 district production wells exceed 5.0 ug/l MTBE after 10 years
    f. 26 additional district production wells exceed 5.0 ug/l MTBE after 20 years
    g. 10 additional district production wells exceed 5.0 ug/l MTBE after 30 years
    h. 11 additional district production wells exceed 5.0 ug/l MTBE after 40 years

9. Clay layers within the OCWD service area will not prevent MTBE from migrating vertically down to deeper aquifers. Clay layers slow, but to not stop downward migration. In addition, clay layers within OCWD's service area have been perforated by numerous wells that act as conduits to deeper aquifers.

10. Differences between actual concentrations of MTBE in wells compared to the predicted concentrations of MTBE by the model are caused by two main factors: (1) there is a very high degree of small scale heterogeneity in the aquifer that causes the MTBE concentrations to be highly variable on a small scale; (2) the model averages MTBE concentrations over a grid block, which is 100 feet by 100 feet in area, and anywhere from 10 to 100 feet thick. By contrast, a sample collected from a well is usually less than 1 liter in size. As a result, the model predictions of MTBE concentrations tend to be fairly "smooth", and the actual MTBE sample data will tend to cluster around the model predictions. This is illustrated in Figure 1.

11. The actual amount of MTBE mass in OCWD aquifers is greatly underestimated for several reasons:
    a. For the purposes of this report, I was initially asked to consider 40 plaintiff gas stations and 10 defense gas stations in Orange County. This list was narrowed down to 5 plaintiff focus plumes, with 29 gas stations, and 5 defense focus plumes with 5 gas stations, for a total of 34 gas stations. There are many more known gas stations within the OCWD and so the total amount of MTBE mass in the aquifer will therefore be underestimated by our models.
    b. As stated above in opinion #6, the average time between known release and start of remediation is 11 years. Because MTBE is highly mobile, it is highly likely that large amounts of the releases from these sites have moved off-site. In 11 years, at an average groundwater velocity of 3 feet/day (typical of OCWD aquifers), an MTBE plume could move approximately 2 miles.
    c. Because there are many more gas stations that actually contribute MTBE mass to the OCWD aquifers than the model uses, the model will, on average, underpredict the amount of MTBE that will contaminate district production wells.

Figure 1



6.1. Origin of MTBE

MTBE is an oxygenate that was added to gasoline at low levels as early as 1979 to cause it to burn more efficiently and to reduce air emissions. In 1990 Congress passed the Clean Air Act Amendments and as a result higher concentrations of MTBE were added to gasoline sold in areas with unhealthy levels of air pollution. It "is almost exclusively used as a fuel additive in gasoline" (US EPA [updated 2008]). "MTBE [(CH3)3C(OCH3), CAS Registry Number 1634-04-4] is a synthetic chemical without known natural sources" (Fan and Alexeef 1999). The only other known use for MTBE is medical, in the treatment of gallstones (Uchida et al. 1994).

6.2. Characteristics of MTBE in Groundwater

"The primary source of MTBE in groundwater has been petroleum releases from leaking underground storage tank systems. Other significant sources include leaking above-ground storage tanks, fuel pipelines, refueling facilities and accidental spills." (McCarthy and Tiemann 2006).

MTBE leaks from USTs and other sources into the subsurface environment. The subsurface environment contains water, and the water is (in most places) in continual motion. The subsurface can be divided into two main zones: the unsaturated zone, and the saturated zone. Soil and rock in the subsurface is porous, that is, it contains holes, or voids, that can contain water. From the surface, down to the water table, the soil and rock material is unsaturated. This means that the holes, or voids in the soil and rock contain mostly air. The water table represents the top of the saturated zone, that is, the top of the zone where the voids in the rock material are completely saturated with water. When water moves from the surface to the subsurface, it moves almost entirely vertically, until it hits the water table. Once the water moves from the unsaturated zone into the saturated zone, the primary direction of flow changes from vertical to horizontal. However, it should be noted that there is usually a small vertical component of flow. That is, even though the water is mostly moving horizontally, it also (usually) continues to move vertically downward, but at a much smaller rate vertically, than horizontally. There are also areas in the saturated zone where water is moving vertically upward, instead of vertically downward.

In the unsaturated zone, downward vertical movement is caused primarily by the influence of gravity. In environments that are relatively wet, vertical migration rates through the unsaturated zone can actually be relatively high, compared to horizontal migration rates in the saturated zone. However, and this is a very important point, horizontal rates are much more variable than vertical rates. So even though the average horizontal rate of movement might be 1 – 10 feet per year, it is common to find groundwater velocities that are much lower and much higher than the average. Geologic layers than contain water are referred to as aquifers. The aquifer property that governs the groundwater velocity is called hydraulic conductivity. It is a well known fact that hydraulic conductivity of geologic materials is highly variable. Hydraulic conductivity is measured in the same units as velocity, in other words, in feet per day, and it varies over 15 orders of magnitude. In other words, if the smallest value of hydraulic conductivity is 1 foot per day, then the largest value would be 1,000,000,000,000,000 feet per day! In other words, it would be a 1 with 15 zeros behind it. This number is one quadrillion, or thousand billion, or a million million. Because there are

6.4. Transport Characteristics of MTBE

Once gasoline encounters the water table, MTBE dissolves in and is transported with groundwater. The principal mechanisms affecting the transport of dissolved contaminants are advection, dispersion, retardation, and degradation (Fetter 1994). Advection is the rate of movement (speed) of contaminant that is equal to the average groundwater velocity (as calculated using Darcy's Law).

Darcy's Law is the law that governs groundwater flow. It is written as follows:

$$V = -\frac{K}{n}\frac{dh}{dx}$$

where V = velocity of groundwater (feet per day)
K = hydraulic conductivity (feet per day)
n = porosity (dimensionless)
dh/dx = hydraulic gradient (dimensionless)

The hydraulic conductivity is the measure of how easy it is for water to flow through the porous rock or soil material (aquifer). The porosity is the fraction of void space in the porous material, and the hydraulic gradient is the slope of the water table.

Contaminants that are dissolved in groundwater move at different rates due to velocity variations at the pore scale, and due to variations in hydraulic conductivity within the geologic layers. This process is referred to as dispersion. The process of dispersion can be thought of as similar to what happens in a road race (e.g. the Bay to Breakers Race, in San Francisco). All of the runners start the race at the same time and at the same place (the starting line). However, due to individual differences in the runners' ability and training, by the time the runners reach the finish line, they are all spread out. The fastest runners reach the finish line first, followed by the average runners, and then finally the slow ones cross the finish line. This process can be seen in Figure 2 below.

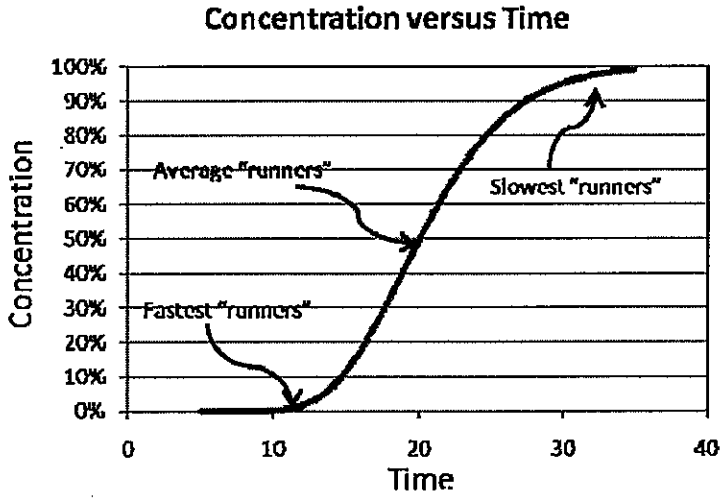


Figure 2.

groundwater levels reached their lowest point ever (20 feet below sea level) in 1955 and sea water was found in groundwater as far as five miles inland (OCWD 2010).

Sea water intrusion is a major problem in coastal aquifers. Sea water intrudes into coastal aquifers, and pumping in the aquifer causes water levels to decline, which causes sea water to intrude further into the aquifer. The sea water intrudes because it is denser than fresh water.

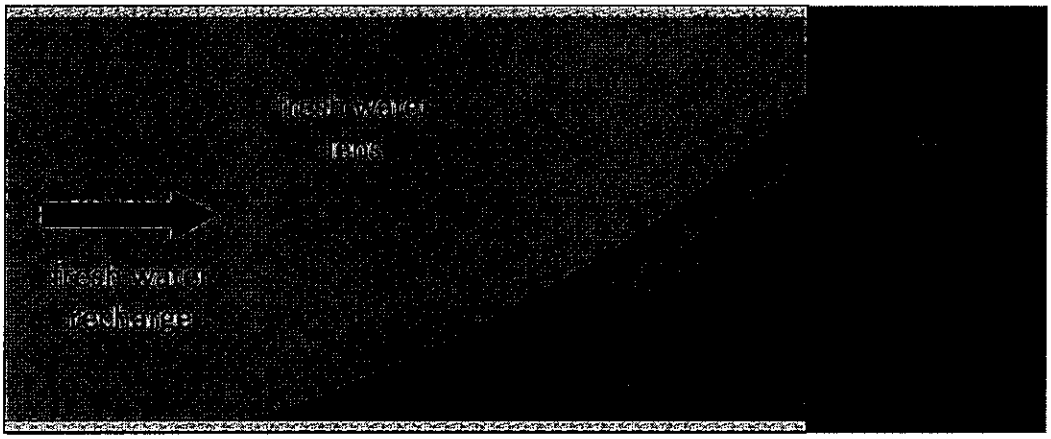


Figure 5. Sea Water Intrusion

The wedge of intruded sea water can be minimized by placing strategically located injection wells in the fresh water lens. These wells act as barriers to intruding sea water.

In an effort to stop the movement of sea water inland OCWD began construction of a sea water intrusion barrier along the Talbert Gap in 1965. A similar barrier in the Los Alamitos area had been in operation since the 1960's. The sea water intrusion barrier consists of 26 injection wells that span the width of the Talbert Gap.

8. Underground Storage Tanks

There are millions of Underground Storage Tanks ("USTs") in operation nationwide and the majority them are used for petroleum products. Each of these USTs is connected to piping, fittings and dispenser(s) and has the potential to leak and release petroleum products. A release may occur as a one-time event (i.e.: a customer spill at the site or petroleum delivery overfill of a UST) or as a continuous slow leak (i.e.: a hole in product piping or severe corrosion with holes in the UST). According to the Environmental Protection Agency, "Leaking underground storage tank systems pose a significant threat to groundwater quality in the United States." (US EPA, 2011)

8.1. Leaking Underground Storage Tanks

If a gasoline release does occur at a UST source the release will migrate through soils beneath the site and into groundwater. Once the gasoline release reaches groundwater near the source it initially floats on top of the groundwater before the individual chemicals that

make up the gasoline begin to separate and mix with the water. The separate chemicals react differently in groundwater and the result is the formation of complex contamination plumes. These chemical plumes will travel along in the groundwater, following the flow downgradient. If contamination plumes from two different sources are in close proximity to one another the plume may mix or comingle in the aquifer. When a contamination plume nears a pumping well the contamination will be caught by the wells capture zone and drawn up into the well.

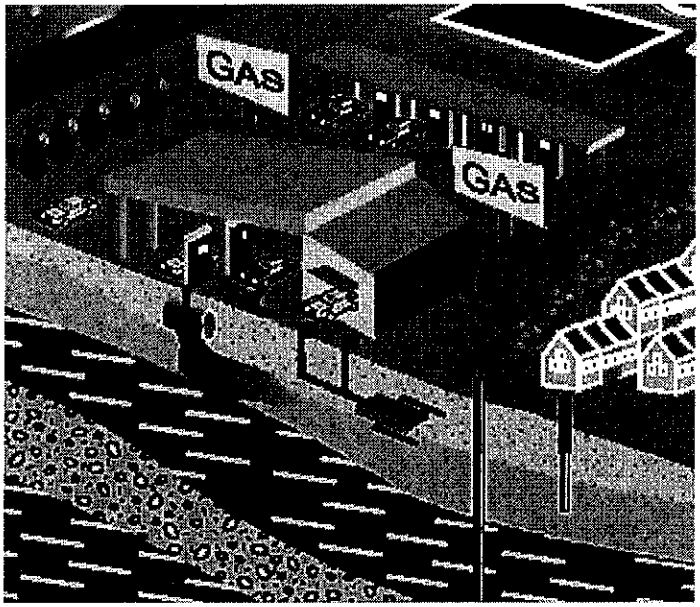


Figure 1. When gasoline leaks from a failed UST system, it moves from the backfill surrounding the tank or piping into the native soil and into ground water; volatile vapors often move upward into and around buildings and infrastructure. Over time, some of the leaked product either floats on top of the ground water table or dissolves into the ground water, where it moves downgradient with the ground water. If there are drinking water wells nearby, the leaked product can be drawn into the wellhead area.

Figure 6 (GWPC 2007)

8.2. UST's in Orange County

In Orange County there 2,961 currently permitted UST's. There are 3022 sites in Orange County where Leaking Underground Storage Tanks have been identified at some point in time. At some of these sites the UST's are no longer permitted or have been removed. The average gas station has four large UST's which contain petroleum hydrocarbons, so each permitted UST does not represent a separate location. Permitted UST's may also be used for waste oil or industrial chemical storage and many of these are distributed throughout Orange County.

8.3. Gas Stations in Focus Plumes

For the purposes of this report I was initially asked to consider 40 plaintiffs gas stations and 10 defense gas stations in Orange County. This list was narrowed down to 5 plaintiff focus plumes and 5 defense focus plumes consisting of 34 focus gas stations that are former or current UST locations. Due to the complex hydrogeological processes taking place in the aquifer beneath Orange County and the amount of time that lapsed between the known release and remediation action many petroleum hydrocarbon releases that occurred at the 34 focus gas stations are comingling in the aquifer. In addition, it is important to understand that since I have been asked to consider only 34 gas stations, and there are 2961 permitted UST's in Orange County any, predictions the model makes regarding future contamination of

an average water year (2002-2003) defined as a year with precipitation approximating the long term average of 14 inches per year. Pumping rates obtained from year 2008 and injection rates from year 2009 are used in the forward simulation to mimic contemporary stresses on the system. The use of average conditions removes climatic bias in projected MTBE transport results. The complete model spans November 1990 through December 2060 with stress (i.e. pumping, groundwater recharge, inter-basin groundwater flow) applied at the monthly time scale.

The term "mass loading" refers to the process of providing the contaminant transport model (for simulation of MTBE concentrations and transport in groundwater) with information regarding MTBE sources. This information consists of three subsets of data: (a) MTBE concentration (or, alternatively, MTBE mass); (b) location of the MTBE application; and (c) duration of MTBE at the source. Mass loading of MTBE is based on observed concentrations at gas station monitoring sites (see sections 12.2 and 12.3 for mass loading techniques employed for this study) with 93% of MTBE loading occurring between years 1996 and 2003. Thirty four gas stations are analyzed. The MTBE transport model performance indicates that 95% of the observed MTBE samples collected BDL are replicated. In other words, for nearly all cases, the model does not suggest that MTBE exists where no MTBE was observed.

The model tends to under predict MTBE concentrations at locations with observed samples above the detection limit (ADL), and therefore, offers a conservative estimate on MTBE transport in many cases. Additionally, we know that MTBE was in gasoline as early as 1979 and routine sampling for MTBE in groundwater was not required until 1998. Analysis of the data from the 34 gas stations in this case shows that on average 11 years passed between the date of first known release and the date groundwater remediation began. The amount of time that passed between the release of gasoline and the first groundwater sample analyzed and/or groundwater remediation being initiated essentially creates gap in known MTBE data. This gap in known MTBE data will cause the model to under predict MTBE concentration in OCWD production wells.

10.2. Flow Model Development and Evaluation

The TMR version of the OCWD basin model (as discussed in the previous section) is obtained by extracting boundary conditions from the OCWD basin model and incorporating detailed geologic information obtained from the Talbert Model. The resultant model is termed the telescopic mesh refined grid or TMR. Figure 7 shows the location of the TMR model domain in relation to the OCWD basin model along with monitoring and pumping well locations included in the model. Figure 8 shows a cross section from A-A' across the TMR grid with geologic/model layers identified, while Table 1 defines hydraulic and transport parameters used in the flow and transport models for each of these geologic layers.

A list of technical steps is provided to highlight the evolution of the flow model. Model development maintains the conceptual model of prior models (OCWD basin and Talbert). Guidelines and recommendations for model calibration and evaluation set forth by the American Society for Testing and Materials (ASTM) Guidelines for Groundwater Modeling (ASTM D 5447, 5490, 5609, 5610, 5611, 5718, 5880, 5981, and 6170) are followed and

Exhibit 3

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

IN RE: METHYL TERTIARY BUTYL ETHER ("MTBE")
PRODUCTS LIABILITY LITIGATION
Master File C.A. No. 1:00-1898 MDL 1358

This Document Relates to:

ORANGE COUNTY WATER DISTRICT
v. UNOCAL CORPORATION, et al.,
Case No. 04 CIV.4968 (SAS)

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MONDAY, JANUARY 16, 2012

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Videotaped Deposition of STEPHEN W. WHEATCRAFT, Ph.D., Expert Witness, Volume I, held at the Law Offices of Latham & Watkins, 505 Montgomery Street, Suite 2000, San Francisco California, beginning at 9:08 a.m, before Sandra Bunch VanderPol, FAPR, RMR, CRR, CSR #3032

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GOLKOW TECHNOLOGIES, INC.
877.370.3377 ph|917.591.5672 fax
Deps@golkow.com

analyzed and considered as part of the source area where you were introducing contamination based on average concentrations?

MS. O'REILLY: Misstates testimony.

Go ahead.

THE WITNESS: I don't -- I don't have a number as to how many there were. I know that there were some. But in the intercourse, we had to focus on the, I believe, 34 individual RP sites that are part of this litigation.

BY MR. STACK:

Q. And stated somewhat differently, based on the work that you did in this case, do you know if all of the detectable MTBE, which was observed in monitoring wells and used to interpolate the mass to be introduced in the model, came from the 34 stations and only the 34 stations?

A. The mass that was introduced in our model came from those 34 sites and the monitoring -- and the concentrations from the monitoring wells on and around those sites. And those were the only ones that we considered.

Q. With respect to the specific release sites causing or contributing to the MTBE contamination that was factored into your mass

particular site?

A. No. That wasn't part of our -- our task.

Q. Did you, or anyone on your staff, look at the concentration of residual contamination present on the site to back-calculate how much contamination may have been released at a particular station?

MS. O'REILLY: Vague and ambiguous.

THE WITNESS: Well, that information was used along with all the information we had for the site in terms of -- particularly if it were monitoring well data, then it was directly used in terms of coming up with a mass -- mass loading calculations.

We examined the data for each and every one of these sites. As I say, a million and a half, roughly speaking, pages of data that we -- that we went through. And there's 42,000 individual concentration data points in our database, just as an example. So there's a lot of data and a lot of information.

Q. With respect to the source areas that you identified, did you utilize any degradation rate to decay the source over time?

A. I believe so.

Q. And with respect to the work that you did in this case, did you actually determine how many leaking underground storage tank sites have been identified in Orange County where there were releases of MTBE with gasoline -- in gasoline?

MS. O'REILLY: Vague. Ambiguous. Overbroad.

THE WITNESS: We -- we didn't determine that specifically. We used the data from the RP sites, which is really defendants' data. We developed our source terms using your data, but we looked at -- again, we didn't separate anything out with regard to site or station. It was just on a per-monitoring well, per-grid cell basis.

BY MR. STACK:

Q. And in looking at your text portion here, it says that you -- the average gas station has four large USTs. That would mean that approximately 740 gas stations are permitted and currently operating in the county; am I correct?

A. So are you taking the 2,961 and dividing by 4?

Q. That's what I did. Yes, Doctor.

A. Don't ask me to do arithmetic. You

REPORTER'S CERTIFICATE

I certify that the witness in the foregoing deposition.

STEPHEN W. WHEATCRAFT, Ph.D.,

was by me duly sworn to testify in the within-entitled cause; that said deposition was taken at the time and place therein named; that the testimony of said witness was reported by me, a duly Certified Shorthand Reporter of the State of California authorized to administer oaths and affirmations, and said testimony, Pages 1 through 226, was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for either or any of the parties to said deposition, nor in any way interested in the outcome of the cause named in said deposition.

IN WITNESS WHEREOF, I have hereunto set my hand this 26th day of January, 2012.

Sandra Bunch VanderPol

SANDRA BUNCH VANDER POL
Certified Shorthand Reporter
Certificate No. 3032

Exhibit 4

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

IN RE: METHYL TERTIARY BUTYL ETHER ("MTBE")
PRODUCTS LIABILITY LITIGATION
Master File C.A. No. 1:00-1898 MDL 1358

This Document Relates to:

ORANGE COUNTY WATER DISTRICT
v. UNOCAL CORPORATION, et al.,
Case No. 04 CIV.4968 (SAS)

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TUESDAY, JANUARY 17, 2012

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Videotaped Deposition of STEPHEN W. WHEATCRAFT, Ph.D., Expert Witness, Volume II, held at the Law Offices of Latham & Watkins, 505 Montgomery Street, Suite 2000, San Francisco California, beginning at 9:03 a.m., before Sandra Bunch VanderPol, FAPR, RMR, CRR, CSR #3032

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being hand in hand or do you think there might be an independent issue that would affect concentration that wouldn't have an impact on timing?

A. They go hand in hand.

Q. What opinions do you have or have you formed that, based on your work, you expect to be opinions that you would express at trial in this case?

MS. O'REILLY: Vague. Ambiguous. Overbroad.

THE WITNESS: I can't anticipate now. There have been no discussions with Mr. Miller, or anyone else, as to specifically what would be testified to at trial. So at this point I would stand on the opinions that I render in my expert report.

BY MR. JON ANDERSON:

Q. Well, there are a lot of things set forth in your expert report, and one of them would be information you provided about what your model predicted, in terms of the timing and concentration of MTBE in wells. Do you recall that that's part of your report?

A. Yes.

Q. And do you have opinions concerning the timing and concentration of future MTBE impacts

in drinking water wells in Orange County?

A. Yes.

Q. Can you tell me what the nature of the opinions would be?

A. Well, I've already expressed them. We have talked about them earlier.

But the nature of the opinions is that there is a great deal of MTBE that has been released into the aquifers in Orange County, and that MTBE is not going away. It's being -- much of it is migrating towards production wells and will reach production wells sometime in the future and become a significant issue that will have to be dealt with unless something has been -- is done ahead of time to remediate the problem.

Q. Do you have an opinion about the quantity of MTBE that has been released into the subsurface in Orange County?

MS. O'REILLY: Vague. Ambiguous. Overbroad. This is asked and answered by Mr. Stack yesterday.

THE WITNESS: I can formulate opinions about the mass in a variety of ways, yes.

BY MR. JON ANDERSON:

Q. Do you presently have opinions about

did not analyze in your work here?

MS. O'REILLY: Vague and ambiguous.

Go ahead.

THE WITNESS: Correct.

BY MR. JON ANDERSON:

Q. Do you have an opinion that MTBE from the collection -- taken all together, of all 34 stations, that some MTBE from those 34 stations has in the past reached one or more drinking water wells as opposed to that MTBE coming from stations or underground storage tanks that you did not include in your model?

MS. O'REILLY: Calls for speculation. Lacks foundation. Assumes facts. Incomplete hypothetical. Vague. Ambiguous. Overbroad.

THE WITNESS: I believe collectively that some MTBE from one or more of these stations has reached one or more production wells in the past.

BY MR. JON ANDERSON:

Q. Did your model tell you that?

A. Yes.

Q. Did the model tell you which stations were involved in contributing to that MTBE contamination?

MS. O'REILLY: Objection. Asked and

answered multiple times. Vague. Ambiguous. Overbroad.

THE WITNESS: I will just restate my answer. I haven't done any analysis to look at whether -- which -- to isolate or identify MTBE from a particular station and whether or not or when it gets to production wells.

BY MR. JON ANDERSON:

Q. What I'm trying to get at -- and you acknowledge on any individual station you have no specific opinion about that MTBE. And now I've given you 34 stations.

What is the basis for you to say that one or more of the 34 stations released MTBE that has gotten into one or more drinking water wells?

MS. O'REILLY: Argumentative. Asked and answered. Misstates testimony.

THE WITNESS: The overall behavior of the model, it is showing MTBE mass moving from these stations towards -- towards the wells and, in some cases, having reached the wells. And there are wells that have had detections. Some of these detections are in the vicinity of these stations and so-called plumes.

So it seems certainly more likely than not

that some of these stations have, in fact, impacted production wells already.

BY MR. JON ANDERSON:

Q. Are you a hydrogeologist?

A. Yes.

Q. And have you used your expertise in hydrogeology to formulate the opinion that one or more of the 34 stations listed has, in fact, impacted one or more drinking water wells with MTBE?

A. Yes, I have.

Q. Okay. And which of these stations, in your opinion, has both a release and a pathway, and to which drinking water wells, where you have that opinion?

MS. O'REILLY: Asked and answered. Argumentative. Misstates testimony.

THE WITNESS: I haven't identified -- the MTBE that gets in the wells is not tagged, so I don't know which station it comes from. It comes from one or more stations on this list because those are all the sources that are there.

BY MR. JON ANDERSON:

Q. But the 34 stations are not the totality of sources in the area, right?

MS. O'REILLY: Objection. Asked and

answered. You're mixing your questions. You're asking about the stations, and then you're asking about sources that aren't in his model. It's vague. Ambiguous. Overbroad. Unintelligible.

Go ahead.

THE WITNESS: Could you ask the question again, please.

BY MR. JON ANDERSON:

Q. I'm trying to find out if, in your analysis, you have objective results that show that MTBE coming from this collection of stations, in fact, has reached the drinking water well as opposed to an alternate hypothesis that the drinking water wells were impacted by one or more different sources of MTBE?

MS. O'REILLY: And I'm going to object again. You're misstating -- misrepresenting what is in his model. It's vague. Ambiguous. Overbroad. Assumes facts. Lacks foundation. And it's been asked and answered multiple times.

THE WITNESS: The plumes that -- and the -- and the RP sites or stations that looking at here were selected by both plaintiffs' and defendants' experts, not by me, over a fairly long period of time as the most likely sources for MTBE releases in close

proximity to District production wells.

So my model shows that these sources impact these wells. And I know from my experience in discussing these matters with not only the attorneys but also with the -- the hydrogeology experts with the Orange County Water District, that these stations were preselected based on careful review of monitoring data, capture zones, gradient directions, pumping well -- pumping rates as being the most likely sources.

I certainly consider it more likely than not that any MTBE that's currently in District production wells are due to one or more of these sources.

BY MR. JON ANDERSON:

Q. Okay. In forming your opinion, did you rely on the representation that was made to you that these stations were the most likely candidates for that contamination reaching the wells?

MS. O'REILLY: Vague and ambiguous.

THE WITNESS: Yes, I did. I think that's what I just said.

MR. JON ANDERSON: That's what I understood you to say. I just wanted to clarify.

Q. And who was it that represented to you that these 34 stations were, in fact, the most

likely candidates for contribution of MTBE that has impacted wells or in the future will impact drinking water wells in Orange County?

MS. O'REILLY: And I'm going to instruct you, to the extent you can, without revealing privileged conversations, go ahead.

THE WITNESS: Well, I'm not sure in that case what a privileged conversation would be. But I -- mostly conversations with Mr. Herndon and Mr. Bolin at the District.

BY MR. JON ANDERSON:

Q. Okay. So you recall that Mr. Herndon and Mr. Bolin told you that these 34 stations were the most likely candidates for the source of MTBE that has or will impact the drinking water wells in Orange County?

A. These plus other stations that were part of the original group that got removed from the list at one point or another for --

Q. And you relied on what Mr. Herndon and Bolin told you in forming your opinions?

A. I did.

Q. Did you do anything to independently verify their representation to you that these 34 stations were the most likely sources of MTBE that

has impacted or will impact drinking water wells in Orange County?

MS. O'REILLY: Vague and ambiguous. Assumes facts.

THE WITNESS: Yes, we reviewed a million and a half pages of information on these various sites from RP reports and data, and assimilated and analyzed and studied and collected this information into a database, and then put that information into a model which certainly is consistent with that opinion.

BY MR. JON ANDERSON:

Q. Did you do independent research to eliminate other potential sources from the analysis that their MTBE may have contaminated the wells?

MS. O'REILLY: And I'm -- I'm going to object that it misstates testimony.

And you can answer to the extent you don't reveal any attorney-client privilege communication, and that you answer with respect to your modeling work.

THE WITNESS: Well, we have done other work, other than just the modeling, as in reviewing and analyzing a million and a half pages of information from RP sites.

Overbroad.

BY MR. JON ANDERSON:

Q. Do you, Dr. Wheatcraft, have any evidence, of which you are aware, any MTBE has migrated off-site from the Unocal 5226 station?

MS. O'REILLY: And I'm going to object to the extent it is vague. Ambiguous. Overbroad. And also to the extent it exceeds the scope of his opinions, which relate to modeling.

Go ahead.

THE WITNESS: There's plenty of evidence for it. The fact that MTBE is -- is present on-site in those monitoring wells, groundwater is flowing, MTBE is highly mobile and dissolves readily in groundwater, it doesn't attenuate very well, it's not very biodegradable, it doesn't sorb very well, it would be great to use as a tracer if it wasn't such a issue in terms of taste and odor and other issues.

So once -- once MTBE is in groundwater, it's going to migrate off-site unless it's stopped. And there's no evidence that that took place in 5226.

BY MR. JON ANDERSON:

Q. Really? You say there's no evidence that the migration was stopped. Please explain that.

MS. O'REILLY: And I'm going to object again

REPORTER'S CERTIFICATE

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STEPHEN W. WHEATCRAFT, Ph.D.,

was by me duly sworn to testify in the within-entitled cause; that said deposition was taken at the time and place therein named; that the testimony of said witness was reported by me, a duly Certified Shorthand Reporter of the State of California authorized to administer oaths and affirmations, and said testimony, Pages 228 through 510, was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for either or any of the parties to said deposition, nor in any way interested in the outcome of the cause named in said deposition.

IN WITNESS WHEREOF, I have hereunto set my hand this 26th day of January, 2012.

Sandra Bunch VanderPol

SANDRA BUNCH VANDER POL
Certified Shorthand Reporter
Certificate No. 3032

In Re Methyl Tertiary Butyl Ether (MTBE) Products Liability Litigation: Orange County Water District v. Unocal Corp., et al., Case No. 04 Civ. 4968

PROOF OF SERVICE VIA LEXISNEXIS FILE AND SERVE

I am a citizen of the United States and an employee in the County of Sacramento. I am over the age of eighteen (18) years and not a party to this action. My business address is Miller, Axline, & Sawyer, 1050 Fulton Avenue, Suite, 100, Sacramento, California 95825.

On the date executed below, I electronically served the document(s) via LexisNexis File & Serve, described below, on the recipients designated on the Transaction Receipt located on the LexisNexis File & Serve website:

DECLARATION OF MICHAEL AXLINE IN SUPPORT OF PLAINTIFF ORANGE COUNTY WATER DISTRICT'S OPPOSITION TO DEFENDANTS' OBJECTION TO AND MOTION TO STRIKE THE DECLARATION OF STEPHEN WHEATCRAFT SUBMITTED IN OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

I declare under penalty of perjury that true and correct copies of the above document(s) were served via LexisNexis File & Serve on August 25, 2014.

Kathy Herron

KATHY HERRON